STATE OF CALIFORNIA

Specification PTH 392B

Thermoplastic Traffic Striping Material Sprayable, White and Yellow

1.0 SCOPE

This specification covers a sprayable reflectorized thermoplastic pavement striping material that is applied at 0.64 - 0.90 mm thickness to portland cement or asphalt concrete road surfaces in a molten state. Upon cooling to normal pavement temperatures this produces an adherent reflectorized stripe capable of resisting deformation by traffic.

2.0 APPLICABLE SPECIFICATIONS

The following specifications, test methods and standards in effect on the opening date of the Invitation for Bid form a part of this specification where referenced.

State of California Specifications Designation: 8010-XXX-99, Inspection, Testing and Other Requirements for Protective Coatings.

California Test Method Designation: No. 423, latest revision.
California Test Method Designation: No. 660, latest revision.

California Department of Transportation, Standard Specifications.

Federal Standard Designation: No. 595b

American Association of State Highway and Transportation Officials, AASHTO Designation: M 247

American Society for Testing and Materials, ASTM Designation: E 11, ASTM Designation: G 53, ASTM Designation: D 2794, ASTM Designation: E 28, ASTM Designation: E 1347, ASTM Designation: E 313.

California Code of Regulations Designation: Title 22.

3.0 REQUIREMENTS

3.1 Composition:

The thermoplastic material shall be 100 % solids. The binder shall consist of thermoplastic resin and plasticizers, and shall be homogeneously incorporated with all necessary pigments, fillers, and glass beads to produce a traffic coating to meet the requirements as specified herein.

When tested according to California Code of Regulations, Title 22, Division 4.5, Chapter 11 - Appendix II (California Waste Extraction Test), the yellow materials shall have an extractable lead content of less than 0.3 mg per liter.

3.2 Form:

The thermoplastic material shall be supplied in either block or granular form as requested in the purchase order.

3.3 Application Type:

The thermoplastic material shall be formulated for spray application at 163 - 191°C to produce a line 0.64 - 0.90 mm thick.

3.4 Characteristics of the Finished Thermoplastic:

California Test Method Designation: No. 423 unless otherwise specified.

		White	Yellow
3.4.1	Glass Beads, Type 1, percent by weight, minimum, AASHTO Designation: M 247	25	25
3.4.2	Inert Fillers, insoluble in hydrochloric acid, Percent passing a screen having openings of 150μm, ASTM Designation: E 11	100	100
3.4.3	Binder, percent by weight, minimum	25	25
3.4.4	Density, g/ml, maximum	2.00	2.00
3.4.5	Ring and Ball Softening Point, minimum ASTM Designation: E 28	93°C	93°C
3.4.6	Test on material after 4 hours heat with stirring at 191°C ± 1°C which includes 1 hour for meltdown and temperature stabilization.		
3.4.6.1	Tensile Bond Strength to an unprimed abrasive blasted Portland cement concrete block, 1.59 mm thick film draw down at 191°C, tested at 25°C ± 1°C, Mpa, minimum	1.24 MPa	1.24 MPa
3.4.6.2	Brookfield Thermosel Viscosity, Spindle SC4-27, 20 rpm at 191°C, Pa·s	0.2 - 1.0 Pa·s	0.2 - 1.0 Pa·s
3.4.6.3	Impact Resistance, 1.59 mm thick film draw down at 191°C on an unprimed abrasive blasted Portland cement concrete block, male indentor 15.9 mm diameter, no female die. Test at 25°C ± 1°C, kilogram force·meter, with no cracks or bond loss, minimum ASTM Designation: D 2794	0.57	0.57

		White	Yellow
3.4.6.4	Daylight Luminous Reflectance ASTM Designation: E 1347	80 Minimum	42 - 59
3.4.6.5	Color, yellow, shall match Federal Standard Designation: No. 595b, color No. 33538 and chromaticity limits shall lie within HUE = 580.0 - 583.5 nanometers, CHROMA x = 0.7050 - 0.5000y and BRIGHTNESS Y = 42 - 59, measured according to California Test Method Designation: No. 660	---	Pass
3.4.6.6	Yellowness Index, calculated as YI = 100(A-B)/G, ASTM Designation: E313, maximum	6	---
3.4.6.7	Ultraviolet Light and Condensation Exposure, 200 hours total: alternate 4 hours UV exposure at 60°C; 4 hours condensate exposure at 40°C, ASTM Designation: G 53		
	White - Yellowness Index, maximum	20	---
	Yellow - Must meet chromaticity limits as specified in 3.4.6.5	---	Pass
3.4.6.8	Abrasion Test - 400 g of graded glass beads between 600 - 850 µm diameter, 150 kPa air pressure, cast sample approximately 125 by 125 by 10 mm Weight loss, grams, maximum	10	10
3.4.6.9	Hardness, Shore A-2 Durometer with 2 kg weight, at 46.1°C	15 - 40	15 - 40

3.5 Other Requirements:

The thermoplastic material shall readily spray at temperatures between 163°C - 191°C.

When applied to the pavement, the thermoplastic material shall be sufficiently tack-free to carry traffic in not more than 2 minutes when the pavement surface temperature is 10°C, and not more than 10 minutes when the pavement surface temperature is 54°C.

3.6 Workmanship:

The pigments, glass beads, and fillers shall be well dispersed in the binder. The material shall be free from all skins, dirt, foreign matter, and other deleterious substances, and shall be of such composition that it will not bleed, stain, or discolor when applied to pavements.

Thermoplastic material shall not emit fumes which are toxic or injurious to persons or property when it is heated to application temperature. The material shall not emit excessive smoke during heating and application.

3.7 Shelf Life:

The material shall maintain the requirements of this specification for a minimum period of one year. Any materials failing to do so shall be replaced by the manufacturer at their expense.

3.8 Air Pollution Compliance:

This material shall comply with all applicable air pollution control rules and regulations.

3.9 Material Safety Data Sheets:

Material Safety Data Sheets shall be provided by the manufacturer to include health hazard information on the material when it is heated to application temperature.

4.0 QUALITY ASSURANCE PROVISIONS

4.1 Inspections:

This material shall be sampled and inspected in accordance with State of California Specification Designation: 8010-XXX-99, or as otherwise deemed necessary. State Specification Designation: 8010-XXX-99 is on file and obtainable at the Department of General Services, Division of Procurement.

The minimum size batch of thermoplastic traffic striping material sampled and tested shall not be less than 900 kg unless the total order is less than this amount.

All thermoplastic material intended for use by the State of California must be sampled and approved by the Office of Materials Engineering and Testing Services before shipment. Manufacturers within the State of California must contact the Sacramento, Emeryville, or Los Angeles Inspection Office for sampling procedures.

Manufacturers outside the State of California must submit the following information before shipment:

1. State Specification number
2. Color; white and/or yellow, and kg of each
3. Form; block or granular
4. Binder Type
5. Exact destination address of shipment
6. Number and identification of batches comprising shipment
7. Date of manufacture
8. Purchase order or contract number

The above information is to be sent to:

Office of Materials Engineering and Testing Services
Structural Materials Branch, Inspection Section
5900 Folsom Boulevard
Sacramento, CA 95819

On delivery, the thermoplastic will be sampled for compliance to specification. Material not meeting the specification shall be removed and replaced by the manufacturer at their expense, including all costs for handling, testing, and shipping.

4.2 Testing:

All tests shall be performed according to the specified test methods, latest revision. Qualitative and quantitative analysis may also be performed by other methods of analysis, at the option of the California Department of Transportation.

5.0 PREPARATION FOR DELIVERY

5.1 Packaging:

5.1.1 Block Form:

The thermoplastic material shall be packaged in suitable containers to which it will not adhere nor interact during shipment or storage. The blocks of cast thermoplastic material shall be approximately 900 by 300 by 50 mm and shall weigh approximately 22.7 kg.

5.1.2 Granular Form:

The thermoplastic material shall be packaged in meltable bags which are compatible with the thermoplastic and which weigh approximately 22.7 kg when filled. The containers must have sufficient strength and be properly sealed to prevent breakage and leakage during normal handling.

5.2 Markings:

Each container label shall include: State Specification Designation Number, color, type of binder, manufacturer's name and address, date of manufacturer, and batch number. All markings on containers shall be legible and permanent. Markings shall not smear or rub off container. Containers failing to meet marking requirements will not be accepted.

The containers and labeling shall meet all applicable US Department of Transportation and Interstate Commerce Commission regulations. Concerning the content, each container shall be labeled with such warnings or precautions as are required by local, state, and federal laws and requirements.

6.0 NOTES

6.1 Certificates of Compliance:

The manufacturer of thermoplastic materials shall furnish the Engineer with a Certificate of Compliance in conformance with the provisions of the California Department of Transportation Standard Specifications, July 1995, Designation: Section 6-1.07, "Certificate of Compliance." The Certificate shall also include a list, by title and section, of all applicable state and federal packaging and labeling laws and a statement that all requirements have been met.

Certificates of Compliance shall be sent to:
Office of Materials Engineering and Testing Services
Structural Materials Branch, Inspection Section
5900 Folsom Boulevard
Sacramento, CA 95819

6.2 The Contractor shall assume all costs arising from the use of patented; materials, equipment, devices or processes used on or incorporated in the work, and further agrees to indemnify and save harmless the State of California and its duly authorized representatives from all suits at law or action of every nature for or on account of the use of any patented; materials, equipment, devices or processes.

DEPARTMENT OF TRANSPORTATION
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